

## Regeln

You have 25 minutes to submit answers. There are 11 questions and a correct answer is always a positive real number i.e. question  $i$  has answer  $\theta_i \in \mathbb{R}_+$  for  $i = 1, 2, \dots, 11$ . Submissions are made in the form of an interval:

$$[\text{Min}_i, \text{Max}_i]$$

Note that both endpoints are included. Each team has 16 guesses hence multiple submissions for questions is possible although the score, and hence the correctness of the guess, will always be based on the **latest** submission to the question. Submissions can be made throughout the quiz. The team's score is given by the formula:

$$\left(10 + \sum_{i: \text{Min}_i \leq \theta_i \leq \text{Max}_i} \left\lfloor \frac{\text{Max}_i}{\text{Min}_i} \right\rfloor\right) \cdot 2^{11 - \#\text{correct guesses}}$$

Where  $\lfloor \cdot \rfloor$  is the floor function.

Hence, at the beginning of the quiz all teams have a score of  $(10 + 0) \cdot 2^{11-0} = 20480$  points.

When the time is up, the team with the **lowest** score wins.

When submitting an interval it must clearly state:

- Team
- Question
- Interval.

Using scientific notation is allowed but must follow the conventions of R e.g.:

100 = 1e2

93.000 = 93e3

1.010.000.000 = 101e7

etc.

After submission the team (and everybody else) will be able to see whether the guess is correct or not and if so the value of the answer in the sum i.e.  $\lfloor \text{Max}_i / \text{Min}_i \rfloor$  as well as the updated total score.

## Fragen

1. Number US president which was the first to be of religion Christian Catholic.
2. The largest difference between *apparent solar time* and *tmean solar time*? I.e. what is the largest difference a perfect solar clock will have to a perfect true clock.
3. Casualties in the deadliest disaster in aviation history
4. According to Finnish Army documents, from the outbreak of the Winter War 30th November 1939 to 22nd of december, how many confirmed sniper kill did Finnish soldier Simo Häyhä (1905-2002), who was known as Belaja Smert in russian (The White Death) have?
5. Super Mario 64, released 1996 has sold more than 11 million games sold, on 11th Nov a new speedrun record was made for completing the game perfectly i.e. 120 stars and not using glitches. What is this record in seconds?
6. ...
7. The width of the painting *Guernica* by Pablo Picasso in cm.
8. Number of recently extinct mammals as classified by the International Union for Conservation of Nature (IUCN). Defined as any mammal that have become extinct since the year 1500 CE
9. Number of sub 1-year old per super 100-year old danish citizens pr november 2020.
10. Size in square kilometer of the Navajo Nation; the largest Native American Reservation in the US.
11. Let  $M_G, M_S, M_B$  be the number of Gold, Silver, and Bronze medals awarded at the Summer Olympics in Rio de Janeiro in 2016. What is  $\max_{i \neq j} \{|M_i - M_j|\}$  ?
12. Number of songs on Spotify with more than 2 billion streamings, as of Nov 2020.
13. What is the lowest possible percentage of the popular vote needed to win the Electoral College, and thereby win the US Presidency.  
Assuming only two candidates and that the number of votes cast in each state is proportional to the population size of said state.
14. Number of days Karl Dönitz served as German head of state.
15. Number of digits in  $100!$

16. Let  $(X_n)_{n \in \mathbb{N}}$  be a discrete Markov Chain on statespace  $S = \{1, 2, 3, 4, 5, 6\}$  with transition probabilities  $\mathbf{p}_{ik} = \frac{1}{6}$ ,  $i, k \in S$ . Let  $X_0 = 2$  and define

$$\tau = \inf \{n \geq \pi : X_n = 6\}$$

what is

$$E \left[ \sum_{n=0}^{\tau} X_n \right]$$